REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-20 are pending in the present application. Claims 1-11 have been amended, and Claims 12-20 have been added by the present amendment.

In the outstanding Office Action, Claims 1-11 were rejected under 35 U.S.C. §103(a) as unpatentable over Pla in view of Yoshioka. This rejection is respectfully traversed.

Amended Claim 1 is directed to an electrical transformer including a core and windings in a tank with active means for varying the volume of the transformer fluid in order to reduce pressure waves. The active means includes a corrugated membrane and attached actuating means. The actuating means actuate the corrugated membrane forcing its vibration which generates pressure waves for changing the volume of the transformer fluid in proportion to an amplitude and frequency of the pressure waves generated by the vibration of said core and winding assembly. Independent Claims 10 and 11 include similar features.

The present invention is directed to reducing, by low cost and effective active means, the transformer noise caused by the vibration of the core and winding subassembly.

The outstanding Office Action indicates Pla teaches an electrical transformer including a core and windings in a tank with active means for varying the volume of the transformer fluid in order to reduce pressure waves and recognizes the active means does not include a corrugated (bellows) member driven by a piezoelectric element. The outstanding Office Action relies on Yoshioka as teaching a vibration damper using a piezoelectric element coupled to a bellows for adjusting fluid pressure.

Applicants first note Yoshioka is directed to a magnifier 20 for magnifying a displacement of a piezoelectric element for use in vibration absorbers and actuators (see

column 1, lines 5-9 and 45-47) and specifically discloses a car engine vibration absorber (see column 3, lines 25 and 26 and Figure 1), which is a completely different technical field from the present invention and Pla. That is, Applicants respectfully submitted Yoshioka is non analogous art.

In addition, the vibration absorber is fixed to an automobile chassis (which undergoes vibration) by a base 4 and a bolt 21 and to the car engine by a disc 5 and a bolt 22, and includes a piezoelectric element 1 fixed to the base 4, and a magnifying device 20. The device 20 includes a rubber absorber 6; a shallow cylindrical case 7; a holder 2 that is operatively connected to the piezoelectric element 1 and is placed between the base 4 and the disc 5; an elastic sealing circular diaphragm 3 with its outer edges welded to the inner circumference of the case 7, and its inner circumference welded onto the flange 2c of the holder 2; and an elastic sealing bellows 11 whose base is welded to the top part of the case 7, while its flat upper face is connected to the disc 5.

The case 7, the bellows 11, the disc 5, the diaphragm and the holder 2 form a sealed chamber 9 containing a fluid medium 10. Further, contrary to the claimed invention, the piezoelectric element 1 is positioned outside the sealed member 9 (partially) in a space open to the atmosphere (see column 1, lines 7 and 8, and Figure 1), and is not solidly connected directly to the bellows 11.

Depending on the operating conditions of the engine (detected by the sensor 30), the piezoelectric element 1 is excited by a voltage signal, and elongates causing movement of the holder 2 in an axial direction and distortion of the diaphragm 3. As a consequence, the volume of the space between the case 7 and diaphragm 3 decreases, and a corresponding amount of fluid 10 is pushed in the bellows which elongates. The fluid pushes up the disc 6 and the gap between the base 4 and the disc 5 is enlarged. The displacement of the holder 2 is transmitted to the base 4.

Specifically, Yoshika teaches to select suitable surface area ratio of circles having as diameters, the outer diameter of the diaphragm 3 and the average diameter of the bellows 11. In this way, the displacement of the holder 2 is magnified by this area ratio and is transmitted to the base 4 so as to suppress the vibrations of the engine mounting, i.e., the chassis to which the base 4 is attached (see column 4, lines 28-60).

The fluid inside the sealed chamber is used just as a hydraulic pump. Yoshioka does not teach or suggest any pressure regulating means nor generation of compensation noise pressure waves. Actually, in Yoshioka, there is not any fluid pressure noise waves to be compensated.

Further, it is respectfully submitted Pla does not teach or suggest the specific structure of the active means according to the present invention (as recognized in the outstanding Office Action). Accordingly, it is respectfully submitted Claims 1-11 are allowable.

In addition, it is respectfully noted that Takahashi cited by the Examiner was not included on the form PTO-892.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE SPECIFICATION

Please amend the specification to read as follows:

Page 1, before line 1, insert:

--TITLE OF THE INVENTION--

Page 1, line 2, delete in its entirety and insert therefor:

--BACKGROUND OF THE INVENTION--

FIELD OF THE INVENTION--

Page 1, between lines 10 and 11, insert:

--DISCUSSION OF THE BACKGROUND--

Page 3, between lines 2 and 3, insert:

--SUMMARY OF THE INVENTION--

Page 4, between lines 2 and 3, insert:

--BRIEF DESCRIPTION OF THE DRAWINGS--

Page 4, between line 11 and 12, insert:

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--

IN THE CLAIMS

Please amend Claims 1-11 to read as follows:

--1. (Amended) An electrical transformer comprising:

[-] a tank containing transformer fluid;

[-] a transformer core and winding subassembly disposed in said transformer fluid within and spaced apart from said tank; and

[-] active means for varying [the] a volume of said transformer fluid in order to reduce pressure waves generated by [the] a vibration of said core and winding subassembly during electromagnetic operation, said active means being disposed in said transformer fluid within said tank[;] ,wherein [characterised in that] said active means comprise at least a cell having:

[-] a main body and a corrugated membrane operatively connected to said main body in order to realize [realise] a sealed container able to maintain a low pressure atmosphere inside said container; and

[-] actuating means placed inside said sealed container and solidly connected to said corrugated membrane for vibrating said corrugated membrane to generate pressure waves to change the volume of said transformer fluid in proportion to an amplitude and frequency of the pressure waves generated by the vibration of said core and winding assembly.

2. (Amended) An electrical transformer as in claim 1, [characterised in that it comprises] further comprising:

elastic means placed inside said cell, operatively connecting said corrugated membrane and said main body.

3. (Twice Amended) An electrical transformer as in claim 1,wherein [characterised in that] said actuating means comprise one or more piezoelectric stack elements.

4. (Twice Amended) An electrical transformer as in claim 1, wherein [characterised in that] said actuating means are connected to controlling means placed outside said tank.

5. (Amended) An electrical transformer as in claim 4, wherein [characterised in that] said controlling means are connected to detection means for detecting pressure waves generated by the vibration of said core and winding subassembly during electromagnetic

operation and transmitting a signal indicative of the amplitude and frequency of said pressure waves to said controlling means.

6. (Amended) An electrical transformer as in claim 5 [characterised in that], wherein said detection means are placed inside the tank of said transformer.

7. (Amended) An electrical transformer as in claim 5 [characterised in that], wherein said detection means are placed outside the tank of said transformer.

8. (Amended) An electrical transformer as in [claims] claim 7 [characterised in that], wherein said detection means comprise one or more transducers for detecting the vibrations of said tank generated by said pressure waves.

9. (Amended) An electrical transformer as in claim 6 [characterised in that], wherein said detection means comprise one or more pressure transducers.

10. (Amended) A method [method] for reducing pressure waves generated by [the] a vibration of [said] a core and winding subassembly during electromagnetic operation of an electrical transformer [as in one or more of the previous claims, characterised in that it comprises the following steps], the transformer having a tank containing transformer fluid, the transformer core and winding subassembly disposed in said transformer fluid within and spaced apart from said tank, and active means for varying a volume of said transformer fluid in order to reduce pressure waves generated by the vibration of said core and winding subassembly during electromagnetic operation, said active means being disposed in said transformer fluid within said tank, said active means including at least a cell having a main body and a corrugated membrane operatively connected to said main body in order to realize a sealed container for maintaining a low pressure atmosphere inside said container, and including actuating means placed inside said sealed container and solidly connected to said corrugated membrane for vibrating said corrugated membrane to generate pressure waves to change the volume of said transformer fluid, said method comprising:

[-] detecting pressure waves generated by the vibration of said core and winding subassembly of said electrical transformer during electromagnetic operation;

[-] transmitting signals, indicative of an amplitude and frequency of said pressure waves, to [said] a controlling means;

[-] analyzing said signals [analysing the signal] transmitted by said detection means and transmitting signals for driving said actuating means comprised in each of said cells; and

[-] generating, through the vibration of the corrugated membrane of each of said cells, transformer fluid pressure waves, varying in amplitude and frequency in proportion to an amplitude and frequency of the pressure waves generated by the vibration of said core and winding assembly, able to regulate the volume of said transformer fluid .

11. (Amended) An active device, for regulating [the] a volume of a fluid in which [said] a device is disposed, through [the] a generation of fluid pressure waves varying in amplitude and frequency, [characterised in that it comprises] said device comprising:

[-] a main body and a corrugated membrane operatively connected to said main body in order to [realise] realize a sealed container able to maintain a low pressure atmosphere inside said container; and

[-] actuating means placed inside said sealed container and solidly connected to said corrugated membrane for vibrating said corrugated membrane to generate pressure waves to change the volume of said transformer fluid in proportion to an amplitude and frequency of the pressure waves generated by the vibration of the core and winding assembly.

Claims 12-20 (New).